Syllabus

Methods of Cognitive Science

CSCI 340
Spring 2021

Tuesdays and Thursdays 1:30 PM – 2:50 PM

Instructor: Bartlett D. Moore IV, PhD
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office hours: By appointment, see http://bart.rice.edu/appointments/

Course overview

Catalog Description:

Cognitive science is a basic science of mental operations in humans, animals, and artificial systems. It is a highly interdisciplinary endeavor that draws on philosophy, psychology, biology, linguistics, and computer science, among other traditional disciplines. This course provides an integrated introduction to the primary empirical methods for studying the human mind. Students will learn how the scientific method is applied to study mental information representation, manipulation, and utilization in natural and artificial cognitive systems. It will teach students to understand existing methodological approaches and recognize what is necessary to replicate results. Topics will include the philosophical foundations of cognitive science, basic methods of cognitive psychology, neuroscience, linguistics, computational modeling, data analysis, and ethical responsibility when conducting cognitive research.

- 3 Credit Hours, CRN 23619

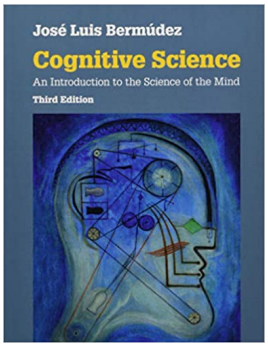
Student Learning Outcomes:

- Learn how the scientific method can be applied to understand mental operations
- Evaluate the merits and limitations of the major cognitive research methodologies
- Synthesize results from complementary methodologies to develop new theories of cognition
- Describe experimental methods in enough detail to replicate results
- Approach the enterprise of cognitive science logically, systematically, and ethically

Course requirements

Optional Textbook:

Cognitive Science: An Introduction to the Science of the Mind (3rd Edition)
by José Luis Bermúdez
Cambridge University Press
ISBN-10: 1108440347 **ISBN-13:** 978-1108440349



Participation:

- Attend class, currently via zoom
- Participate in discussions

Assignments:

- Mock research abstract (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3732725/)
- Mock scientific poster (https://guides.nyu.edu/posters)
- Mock scientific article with figures and Introduction, Methods, Results, and Discussion sections
- Peer review of two other articles
- Revise and resubmit mock scientific article

Examinations:

- Midterm Exam and Comprehensive Final Exam

Grade Policies:

Final grades are calculated as follows:

Graded items	Weight
Abstract	5%
Poster	20%
Mock research article	20%
Peer Review	10%
Mock article revision	5%
Midterm Exam	20%
Final Exam	20%
Total:	*100%*

Weighted average	Letter Grade
90-100%	A
87-89%	B+
83-86%	B
80-82%	B-
77-79%	C+
73-76%	C
70-72%	C-
67-69%	D+
63-66%	D
60-62%	D-
Below 60%	F

Course policies:

Absence policies:

- Attendance is expected either online or face-to-face
- Lecture slides are not intended as a substitute for attending class
- Makeup work will only be accepted if the student informs the instructor *in writing, in advance*
- Reasonable accommodations will be made to allow students to observe their religious holidays without jeopardizing academic obligations. However, students are expected to inform the instructor about potential absences.

Rice Honor Code:

In this course, all students will be held to the standards of the Rice Honor Code, a code that you pledged to honor when you matriculated at this institution. If you are unfamiliar with the details of this code and how it is administered, you should consult the Honor System Handbook at http://honor.rice.edu/honor-system-handbook/. This handbook outlines the University's expectations for the integrity of your academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process.

Disability / Special Needs Statement:

If you have a documented disability that may affect academic performance, you should: 1) make sure this documentation is on file with Disability Resource Center (Allen Center, Room 111 / adarice@rice.edu / x5841) to determine the accommodations you need; and 2) meet with me to discuss your accommodation needs.

Syllabus subject to change:

The information contained in this course syllabus is intended as a guide for course conduct. Specific details, with the exception of the absence policies, may be subject to change and you will be informed beforehand.

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Course Schedule

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Tuesdays and Thursdays 1:30 PM – 2:50 PM via Zoom

Week	Topic	Recommended Readings	Event
Week 1	Introduction & Background	0.1-0.3	Literature searches
Week 2	Philosophical foundations	1.1-1.4	
Week 3	Neuroscience: The damaged brain	9.1	Abstracts due
Week 4	Neuroscience: Electrophysiology	9.2	
Week 5	Neuroscience: Imaging	3.5, 3.6	Mock poster due
Week 6	Psychology		
Week 7	Psychology		**Midterm Exam**
Week 8	Linguistics	1.3, 4, 10.1, 10.2	
Week 9	Computing: Neural networks	5.1, 5.2, 5.3, 5.4, 10.3	Mock paper due
Week 10	Computing: Machine learning	12.1-12.3	
Week 11	Computing: Analysis, Statistics, Bayes	7.1, 7.2. 10.4	Peer reviews due
Week 12	Computing: other		
Week 13	Ethical conduct in research		Paper revisions due
Week 14	Wrap up		**Final Exam**

Notes

- Some course exercises may use Matlab Online. You will need to make a MathWorks account to use the software through Rice University: https://www.mathworks.com/academia/tah-portal/rice-university-40580441.html